

REMARKS

Claims 1-20 are pending in this application. Claims 10-20 have been added. Claims 1, 4 and 6 have been amended. No new matter has been added by way of these amendments and new claims because each amendment and new claim is supported by the present specification. For example, as can be seen, the amendments to claims 1, 4 and 6 are editorial in nature. New claim 10 has support in the present specification at page 7, lines 18-19. New claim 11 is supported at page 11, lines 15-16. New claim 12 has support at page 11, lines 19-21. New claim 13 is supported by page 11, lines 23-25 of the specification. New claim 14 has support at page 15, lines 20-21. New claim 15 is supported by page 15, lines 23-25. New claim 16 is supported at page 16, lines 19-22. New claim 17 has support in the paragraph bridging pages 17-18. New claim 18 is supported by original claim 1. New claim 19 has support at page 10, lines 1-6. New claim 20 is supported by the specification at page 10, lines 7-15. Thus, no new matter has been added.

Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Issues Under 35 U.S.C. § 112, Second Paragraph

Claims 4-7 stand rejected under 35 U.S.C. § 112, second paragraph, for reasons of indefiniteness. Applicants respectfully traverse.

Applicants respectfully refer the Examiner to amended claim 4, whereby the nonionic polymer side chain (R) comprises either the first polymer, the second polymer, the copolymer or the group represented by formula (4).

With regard to claim 6, Applicants note that "by the reaction" is no longer being recited.

Thus, Applicants respectfully submit that the presently pending claims recite definite claim language. Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

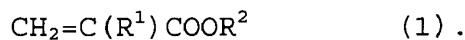
Issues Under 35 U.S.C. § 102(e)

Claims 1-4 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ma et al. (U.S. Patent Number 6,117,921; hereinafter Ma '921). Applicants respectfully traverse.

The Present Invention

Specifically, the present invention is directed to a water-based ink having (A) a coloring material and (B) an aqueous dispersion of polymer particles having a water-insoluble graft copolymer having an acrylic polymer side chain (P) and a salt-forming group (Q). In the

present invention, the acrylic polymer side chain (P) is a polymer made at least one monomer represented by the formula (1):



In formula (1), R¹ is a hydrogen atom or an alkyl group having 1 to 5 carbon atoms, and R² is an alkyl group having 1 to 20 carbon atoms.

Other embodiments of the present invention include, for example, various types of the graft copolymer (i.e., claims 2, 4, etc.), the types of monomers used (claim 3), and the content of the colorant or the acrylic polymer side chain (claims 10 and 13, respectively). Many other embodiments are recited in the other presently pending claims.

In contrast, the cited Ma '921 reference fails to disclose all features of the present invention as instantly claimed.

Distinctions over the Ma '921 Reference

The Ma '921 reference is directed to dispersants (see Abstract), whereby a graft copolymer having a backbone and a side chain portion is disclosed at Col. 2, lines 29-30. The disclosed side chain portion is either a hydrophobic portion or a hydrophilic portion, wherein the hydrophobic portion contains at least 50% by weight of a monomer selected from the group consisting of aryl esters of acrylic acid, N-aryl acrylamide, N-aryl methacrylamide and vinyl aryl esters (see Col. 2, lines 29-39). The Office Action also states that "the hydrophobic portion is obtained from at least 50% monomer including

(meth)acrylate..." (at page 3 of the Office Action). However, Applicants respectfully submit that this conclusion is inaccurate.

Instead, Ma '921 discloses that all of the amides and esters have an aryl group in its molecule, wherein the hydrophobic portion is "aromatic."

In contrast to the Ma '921 reference, the present invention uses a polymer made of a monomer represented by the formula (1), which is hydrophobic because the polymer does not have a hydrophilic group in its molecule. Thus, the acrylic polymer side chain (P) (as recited in claim 1) is hydrophobic. But in the present invention, since the acrylic polymer side chain (P) does not have an aryl group, the acrylic polymer side chain (P), *i.e.*, the hydrophobic portion, is not aromatic. In other words, since the hydrophobic portion, *i.e.*, the side chain, according to the present invention is quite different from the hydrophobic portion of Ma '921, Applicants respectfully submit that the graft copolymer as instantly claimed is different from the graft copolymer of Ma '921.

With regard to the Office Action, the Examiner refers Applicants to Example 11 of Ma '921. However, Example 11 of Ma '921 discloses a graft copolymer of 2-phenoxyethyl acrylate (or aryl acrylate) -co-N,N-dimethylaminoethyl methacrylate (*i.e.*, the hydrophobic portion) -g-ethyoxytriethyleneglycol methacrylate-co-methacrylic acid (*i.e.*, the hydrophilic portion). Because the Ma '921 reference discloses 2-

phenoxyethyl group is an aryl group, the hydrophobic portion of the graft copolymer is aromatic. This disclosure in Ma '921 is in contrast to the subject matter of the present invention.

In the present invention, the hydrophobic portion of the graft copolymer is not aromatic (as mentioned above). Thus, the graft copolymer as disclosed in Example 11 of Ma '921 is not the same as that of the present invention.

Therefore, because "a claim is only anticipated if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," the cited Ma '921 reference cannot be a basis for a rejection under § 102(e). See *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, due to the lack of disclosure present in Ma '921, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Issues Under 35 U.S.C. § 102(b)

Claims 1-4 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Anton *et al.* (U.S. Patent Number 6,005,023; hereinafter Anton '023). Applicants respectfully traverse.

Anton '023 is directed to an ink containing an aqueous carrier medium, whereby the Office Action refers to parts of Columns 1, 2, 3, 4, 5 and 8 of Anton '023. However, Applicants respectfully submit that

Anton '023 does not disclose a graft copolymer having a hydrophilic backbone and a hydrophobic side chain.

Instead, Anton '023 discloses a graft copolymer that is different than the present invention. Specifically, at Col. 3, lines 17-33 and 48-59, and at Col. 4, lines 12-16, Anton '023 discloses a polymeric backbone that is hydrophobic, and a side chain that is hydrophilic. In contrast to this disclosure in Anton '023, the present invention has the side chain of the claimed graft copolymer as being hydrophobic, since the graft copolymer is composed of the monomer represented by formula (1) (as recited in claim 1). Further, Applicants respectfully submit that Anton '023 fails to disclose the claimed side chain composed of the monomer represented by formula (1).

Thus, Anton '023 does not disclose all features as instantly claimed. Instead, Anton '023 is directed to a different graft copolymer that what is instantly claimed. Accordingly, under *Verdegaal Bros.*, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Issues Under 35 U.S.C. § 103(a)

Claims 5-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ma '921 or Anton '023 either of which in view of Tone et al. (U.S. Patent Number 5,336,725; hereinafter Tone '725). Also, claims 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable

over Ma '921 or Anton '023 either of which in view of Nguyen et al. (U.S. Patent Number 6,057,384; hereinafter Nguyen '384) or Razavi (U.S. Patent Number 5,629,365; hereinafter Razavi '365). Claim 8 is also rejected under 35 U.S.C. § 103(a) as being unpatentable over Ma '921 or Anton '023 either of which in view of Yui et al. (U.S. Patent Number 5,977,207; hereinafter Yui '207). In addition, claims 1, 4 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Beach et al. (U.S. Patent Number 5,589,522; hereinafter Beach '522) in view of Ma '921. Further, claims 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Beach '522 in view of Ma '921 as applied to claims 1, 4 and 7 above, and further in view of Nguyen '384 or Razavi '365. Finally, claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Beach '522 in view of Ma '921, as applied to claims 1, 4 and 7 above, and further in view of Yui '207. Applicants respectfully traverse all of these rejections.

The Advantages of the Present Invention

As mentioned, the present invention is directed to a water-based ink having (A) a coloring material and (B) an aqueous dispersion of polymer particles having a water-insoluble graft copolymer having an acrylic polymer side chain (P) and a salt-forming group (Q). The acrylic polymer side chain (P) is a polymer made at least one monomer represented by the following formula (1): $\text{CH}_2=\text{C}(\text{R}^1)\text{COOR}^2$ (1).

Further, the polymer made of a monomer represented by the formula (1) is hydrophobic because the polymer does not have a hydrophilic group in its molecule.

The present invention has unexpected advantages, which have been experimentally confirmed. As can be seen from Table 3 (at page 48 of the present specification), the present invention has unexpectedly achieved clear printed characters, excellent light fastness, as well as excellent printed states, and is free from scorching on printer heads or clogging of nozzles, over the comparative examples (see also page 49, first paragraph of the specification for a summary of these advantages).

In contrast to the present invention, the cited Ma '921, Anton '023, Tone '725, Nguyen '384, Razavi '365, Yui '207 and Beach '522 references, whether these cited references are combined or not, fail to disclose all features and advantages of the present invention.

Distinctions over All of the Cited Combinations of References

Applicants respectfully submit that a *prima facie* case of obviousness has not been formed with respect to the asserted combinations of Ma '921, Anton '023, Tone '725, Nguyen '384, Razavi '365, Yui '207 and/or Beach '522, because not all requirements for a *prima facie* case of obviousness have been satisfied.

U.S. case law squarely holds that a proper obviousness inquiry requires consideration of three factors: (1) the prior art reference (or references when combined) must teach or suggest all the claim limitations; (2) whether or not the prior art would have taught, motivated, or suggested to those of ordinary skill in the art that they should make the claimed invention (or practice the invention in case of a claimed method or process); and (3) whether the prior art establishes that in making the claimed invention (or practicing the invention in case of a claimed method or process), there would have been a reasonable expectation of success. See *In re Vaeck*, 947 F.2d, 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); see also *In re Kotzab*, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000); *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988).

In other words, the cited references must disclose or teach all features as claimed. In addition, the references themselves must state the motivation or suggestion to combine the references, and one having ordinary skill in the art must reasonably expect to be successful in achieving the present invention upon reading the references.

In applying case law such as *In re Vaeck* and *In re Kotzab*, a *prima facie* case of obviousness has not been established. Applicants note that Ma '921 and/or Anton '023 are used in each of these rejections under § 103(a).

First, as mentioned above, the disclosure in Ma '921 is in contrast to the subject matter of the present invention. This is because the

hydrophobic portion of the graft copolymer of the present invention is not aromatic (as disclosed in Ma '921). Thus, Ma '921 fails to satisfy the first requirement for a *prima facie* case of obviousness.

Similarly, the cited Anton '023 reference fails to satisfy the initial requirement for a *prima facie* case of obviousness. This is because the present invention has the side chain of the claimed graft copolymer as being hydrophobic, since the graft copolymer is composed of the monomer represented by formula (1) (as recited in claim 1). This feature is not true of the Anton '023 copolymer because Anton '023 teaches a different graft copolymer. The Anton '023 reference also fails to disclose the claimed side chain composed of the monomer represented by formula (1).

Thus, both Anton '023 and Ma '921 fail to disclose all features as instantly claimed, and neither cited reference satisfies the first requirement for a *prima facie* case of obviousness.

Applicants further submit that all of the other cited references fail to account for the deficiencies of both Ma '921 and Anton '023.

For example, the Tone '725 reference is directed to a method of preparing a type of graft copolymer (see Abstract), whereby the Office Action further refers to other portions of Columns 1, 2, 3, 10 and 11 (at page 6 of the Office Action). However, there is no disclosure in Tone '725 that could account for the deficiencies of Ma '921 (i.e., disclosing an aromatic hydrophobic portion) or Anton '023 (i.e., Anton

'023 fails to disclose the claimed side chain composed of the monomer represented by formula (1) as instantly claimed). Further, Applicants submit that none of the other cited references of Nguyen '384, Razavi '365, Yui '207 and Beach '522 account for these deficiencies of Ma '921 and Anton '023. Thus, Applicants respectfully submit that a *prima facie* case of obviousness has not been formed with regard to Ma '921, Anton '023, Tone '725, Nguyen '384, Razavi '365, Yui '207 and/or Beach '522, because none of these references account for the deficiencies of one another.

In addition, Applicants respectfully submit that the cited references fail to provide the requisite motivation and reasonable expectation of success that one skilled in the art needs in order to achieve the present invention. There are three possible sources of motivation to combine references: the nature of the problem to be solved, the teaching of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998).

In the present application, none of the cited references (including Ma '921 and Anton '023) provide the necessary motivation to produce the present invention. This is because both Ma '921 and Anton '023, which are used in each of the above rejections, employ different copolymers in their disclosure.

Thus, one having ordinary skill in the art would not, upon reading Ma '921 or Anton '023, be motivated in achieving the present invention when different side chains, polymers, monomers, and backbones are disclosed. Applicants note that while the reference need not expressly teach that the disclosure contained therein should be combined with another, *see Motorola, Inc. v. Interdigital Tech. Corp.*, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997), the showing of combining references "must be clear and particular". *See In re Dembicza*k, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Here, there is no clear guidance in any of the cited references, including Ma '921 and Anton '023, to achieve the formulations as presently claimed. Therefore, Applicants respectfully submit that the other requirements of motivation and reasonable expectation of success, for a *prima facie* case of obviousness, have also not been satisfied.

Based on above remarks, Applicants respectfully submit that the present invention is patentably distinguishable from the cited Ma '921, Anton '023, Tone '725, Nguyen '384, Razavi '365, Yui '207 and Beach '522 references. Accordingly, Applicants respectfully request the Examiner to reconsider and to withdraw all rejections and allow the currently pending claims.

A full and complete response has been made to all issues as cited in the Office Action. Thus, Applicants respectfully request that the Examiner pass the application to issue.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Eugene T. Perez (Reg. No. 48,501) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

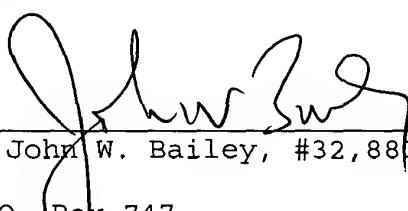
Attached hereto is a marked-up version of the changes made to the application by this Amendment.

Pursuant to 37 C.F.R. § 1.17 and 1.136(a), Applicants respectfully petition for a three (3) month extension of time for filing a response in connection with the present application. The required fee of \$920.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

(Rev. 02/20/02)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

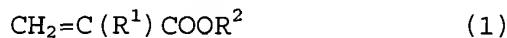
IN THE CLAIMS:

The claims have been amended as follows:

1. (Amended) A water-based ink comprising:

[(C)] (A) a coloring material; and

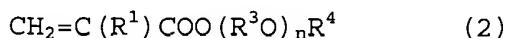
[(D)] (B) an aqueous dispersion of polymer particles comprising a water-insoluble graft copolymer having an acrylic polymer side chain (P) and a salt-forming group (Q), wherein the acrylic polymer side chain (P) [comprises] is a polymer made of at least one monomer represented by the formula (1):



wherein R^1 is a hydrogen atom or an alkyl group having 1 to 5 carbon atoms; and R^2 is an alkyl group having 1 to 20 carbon atoms.

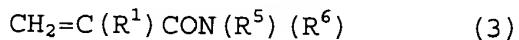
4. (Amended) The water-based ink according to any one of claims 1 to 3, wherein the graft copolymer has a nonionic polymer side chain (R) comprising:

(I) a polymer made of at least one monomer represented by the formula (2):



wherein R¹, R³ and R⁴ are as defined above; and n is a number of 1 to 60;

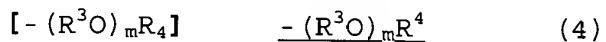
(II) a polymer made of at least one monomer represented by the formula (3) :



wherein R¹ is as defined above; and each of R⁵ and R⁶ is independently a hydrogen atom or an alkyl group having 1 to 5 carbon [atoms, or] atoms;

(III) a copolymer made of at least one monomer represented by the formula (2) and at least one monomer represented by the formula (3); or [is]

(IV) a group represented by the formula (4) :



wherein R³ and R⁴ are as defined above; and m is a number of 3 to 60.

6. (Amended) The water-based ink according to claim 5, wherein the polymer (S) is a polymer having an initiator structure prepared by converting to an initiator structure an initiator precursor structure of a polymer (T) having an initiator precursor structure which is convertible to an initiator [structure by the reaction,] structure, and the polymer (T) is a homopolymer made of a monomer (n) having an

initiator precursor structure, or a copolymer of the monomer (n) with a monomer (o) copolymerizable with the monomer (n).

Claims 10-20 have been added.